Kurzweil K2500 Rack and Keyboard
KDFX Installation Manual

This document instructs Kurzweil service technicians in the installation of a KDFX Option Kit into a K2500R or a K2500/X Keyboard. It is intended *only* for authorized Kurzweil service technicians. Installation by unauthorized personnel will void the warranty.

Important Notices

The KDFX Option requires K2500 Operating System Version 3 or higher.

Before Beginning the Installation

Back up the K2500's RAM objects by entering Disk mode, pressing the **Save** soft button, and selecting the option "Everything" to save all RAM objects to a floppy or hard disk.

Tools and Materials Required For Installation

- #1 (small) Phillips screwdriver
- #2 (medium) Phillips screwdriver
- Flat-head screwdriver
- 3/16" nut driver
- Digital Voltmeter
- Pliers

Components of the KDFX Option Installation Kit

Caution: The KDFX Option includes a pair of static-sensitive ROMs. Observe all precautions for handling electrostatic sensitive devices when installing the ROMs.

- KDFX Board
- Digital I/O Board (small board with two XLR connectors)
- KDS Output Board (small board with 15-pin connector)
- Flash SIMM Board
- Two KDFX Expansion SIMMs
- DC Power Cable
- Three wire splices*
- Four large standoffs
- Two small standoffs (hex nuts)
- Two Cover Plates*
- Two flat washers
- Two lock washers
- Eight M3x6mm black Phillips screws
- Four M3x10mm black Phillips screws
- Operating System and Objects diskettes

*Only used for keyboard units.

The KDFX, Digital I/O, and KDS Output Boards come from the factory with cables pre-connected. If the cables become unconnected, reconnect them as shown in Figure 1.
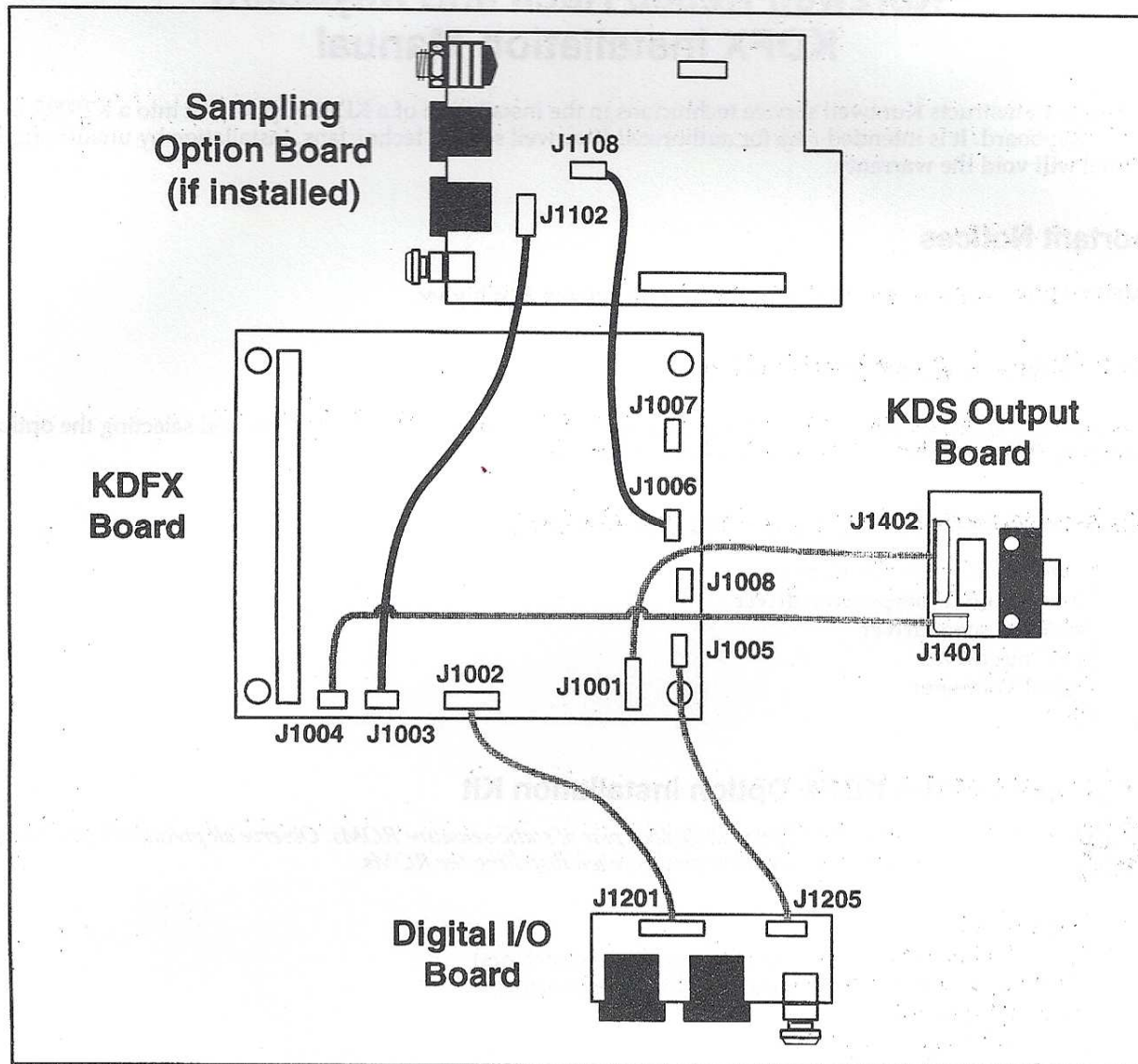
Sampling Option Board (if installed)

J1108

J1102

KDFX Board

J1007

J1006

KDS Output Board

J1402

J1008

J1005

J1401

J1002

J1001

J1004 J1003

J1201 J1205

Digital I/O Board

Figure 1.

Beginning The Installation

The installation procedure is divided into four parts: Disassembly, Installation, Reassembly, and Operating System Load/Diagnostics.

Disassembly

Disassembly for Rack Units

1. Unplug all external wires, cables, and connectors from the K2500R and turn the unit so that the front panel faces you.

2. Using a #2 Phillips screwdriver, remove the six long M4 screws on the left and right sides of the K2500R, towards the front of the unit.

3. Using a #2 Phillips screwdriver, remove the two short M4 screws on the left and right sides of the K2500R, towards the rear of the unit. Using a #1 Phillips screwdriver, remove the two small M3 screws located on the top edge of the rear panel.

WARNING: *The rear screws on each side of the K2500R are shorter than the other side screws. Make sure to keep these screws separate from the others so that you will use the shorter screws in the back side positions when you reassemble the unit. Using the longer screws in these positions could short out some of the components in the K2500R and damage the unit.*

4. Lift the top cover from the back, slide it off and place it aside. Notice that there is a groove on the top edge of the front panel that the top cover fits snugly into.
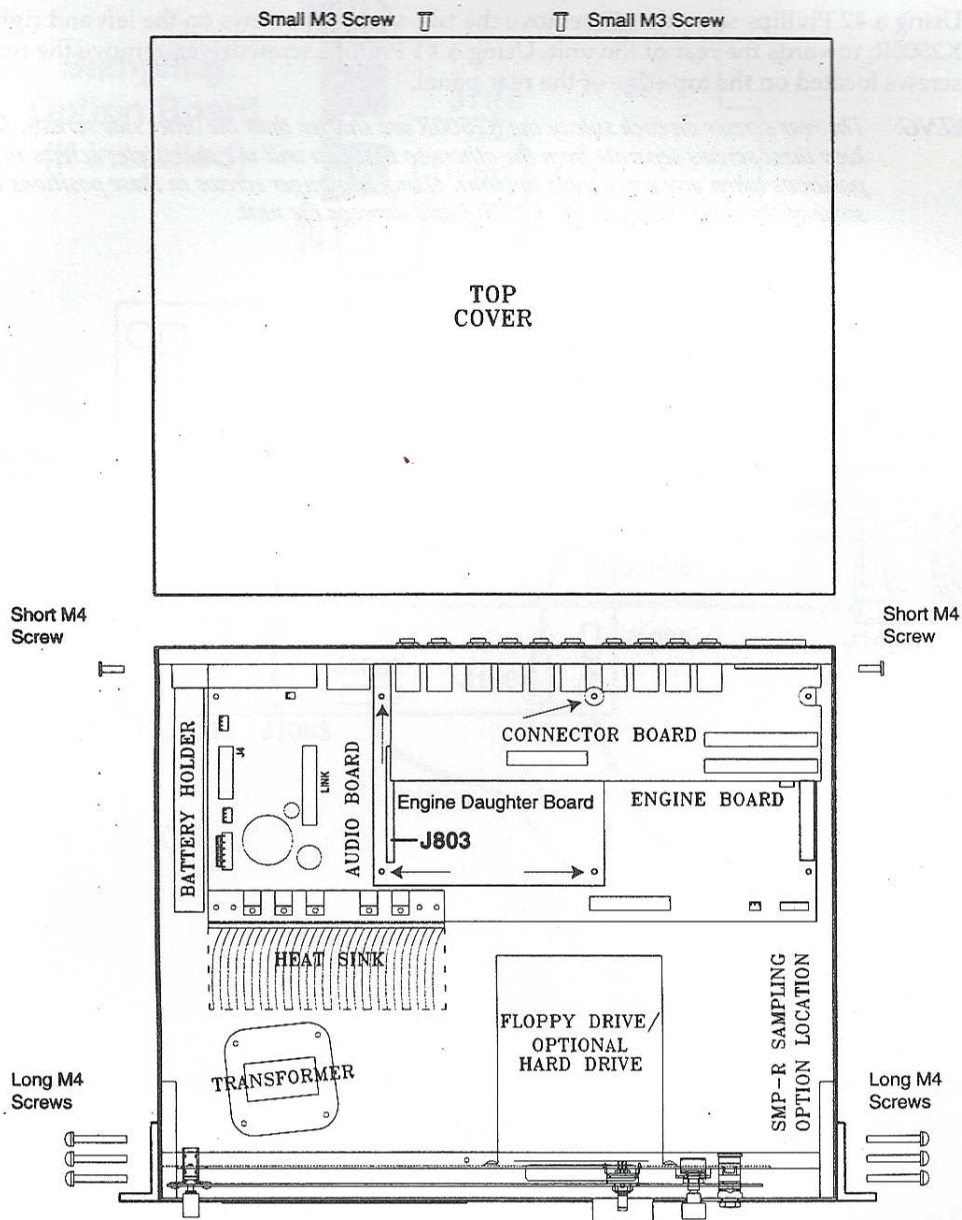
Small M3 Screw · · · Small M3 Screw

TOP
COVER

Short M4
Screw

Short M4
Screw

BATTERY HOLDER

AUDIO BOARD

CONNECTOR BOARD

Engine Daughter Board   ENGINE BOARD

J803

HEAT SINK

FLOPPY DRIVE/
OPTIONAL
HARD DRIVE

SMP–R SAMPLING
OPTION LOCATION

TRANSFORMER

Long M4
Screws

Long M4
Screws

Figure 2. Top view of opened K2500R, showing locations of Engine Daughter Board screws.

1. Unplug all external wires, cables, and connectors from the K2500 and turn the unit so that the keyboard faces you.

2. Tilt the entire unit onto a soft surface, so that it rests on its rear panel. Using a #2 Phillips screwdriver, remove the screws on the bottom of the unit, as shown in Figure 3. The K2500 has six screws, while the K2500X has seven; each screw may be in any one of the three slots of each group along the bottom of the unit.
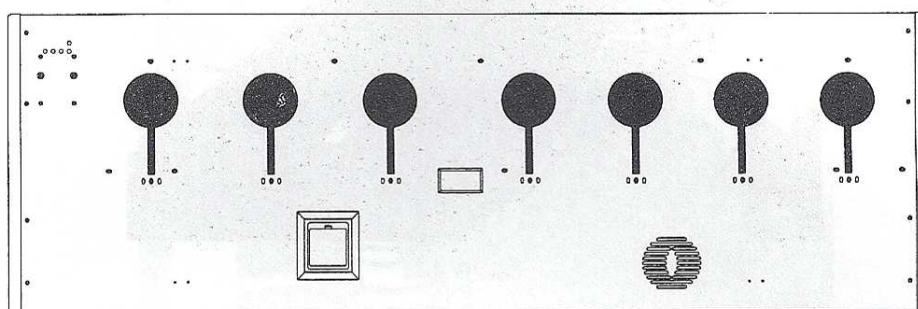
K2500X (88 Keys)
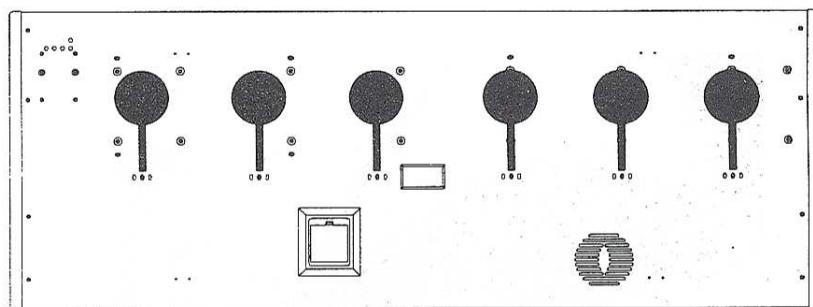
K2500 (76 Keys)

Figure 3.

3. Tilt the K2500 so it again rests on its bottom. Then use a #2 Phillips screwdriver to remove 9 screws on the rear panel of the unit, as shown in Figure 3. Be careful to remove only the screws indicated.

Figure 4.

4. Place two 3" high foam blocks (or other soft items) behind the K2500; again, these blocks will prevent damage to the K2500's sliders and alpha wheel. This will also give you access to the rear panel jacks.

5. Push the top cover with your thumbs, as shown below. You will feel the top become unlocked, and it should slide back about 1/2".
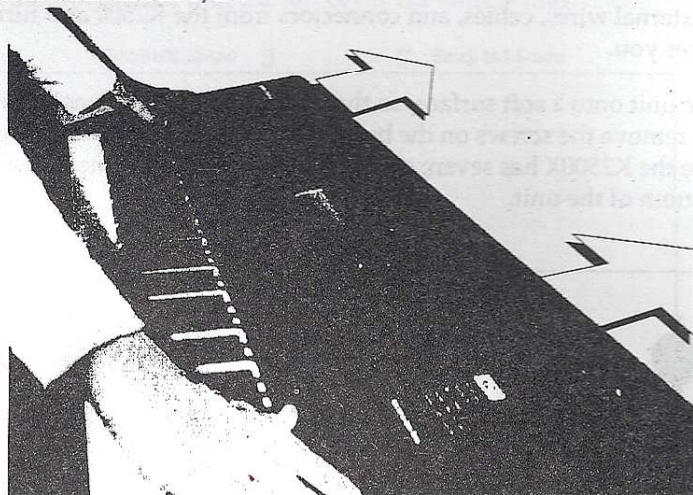

Figure 5.

6. Lift the top cover up, then slide it to the right (so the floppy drive clears the top cover bracket), as shown below. Be careful not to damage the floppy drive.
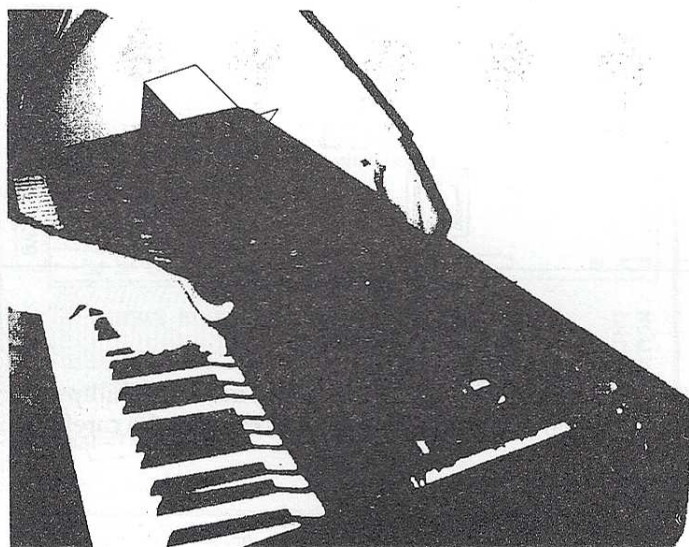

Figure 6.

7. Once the top cover is free, slide your fingers under the felt attached to the front edge of the top, as shown below. Then tilt the top cover back, placing it up-side down on the two foam blocks. The underside of the K2500's top should now face you, exposing the circuit boards for service.
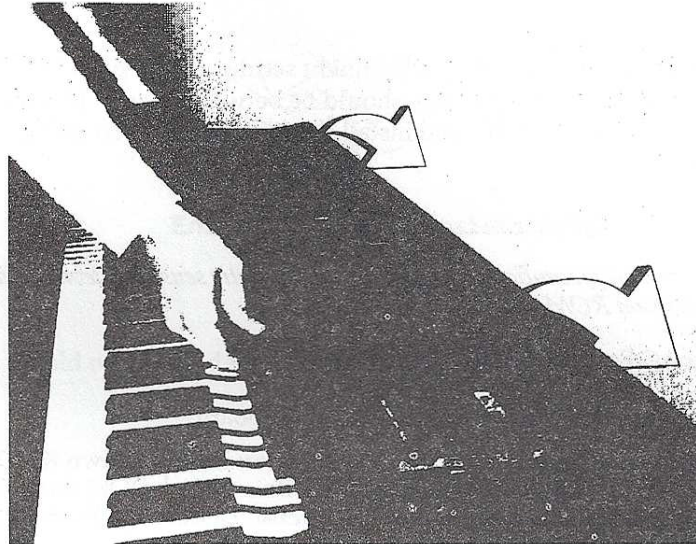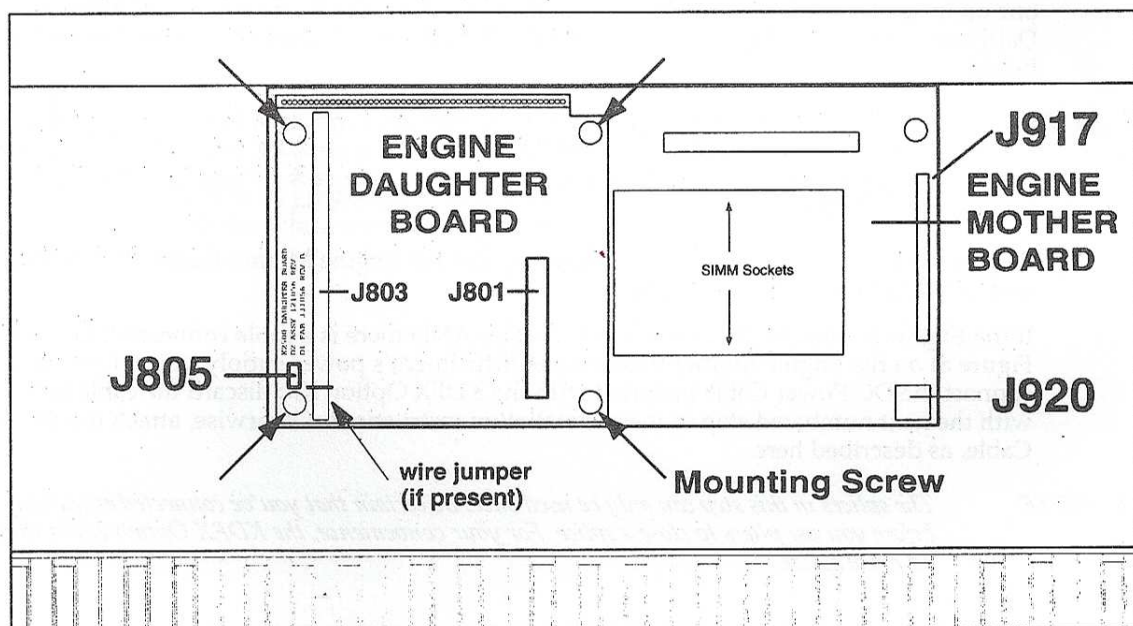

Figure 7.

Figure 8. Top view of opened K2500/X, showing locations of Engine Daughter Board screws.

Installation

⚡ WARNING: *Avoid contact with live voltages in the opened unit.*

1. Check and record the LCD coarse adjustment setting at J917 pin 4 (see Figure 8) on the Mother Board (pin 1 is ground). The voltage should be between -7 and -10 volts. Since you will have to readjust the LCD contrast after you install the KDFX board, record the voltage in the space provided below:

    LCD Contrast Voltage: _____

⚠ Caution: *Observe all precautions for handling electrostatic sensitive devices when installing the KDFX Expansion ROMs.*

2. Remove the AC Power Cable from the K2500.

3   Check the revision level of the Engine Daughter Board.

    If the Engine Daughter Board is Rev. D or earlier: install the two KDFX Expansion ROMs into sockets U16 and U17 on the Engine Daughter Board. Each ROM must be oriented so that pin one lines up with pin one on its corresponding socket. Discard the Flash SIMM Board that was included with the KDFX Option Kit.

    If the Engine Daughter Board is Rev. E or later: install the two KDFX Expansion ROMs into the sockets on the Flash SIMM Board. Each ROM must be oriented so that pin one lines up with pin one on its corresponding socket. Then install the Flash SIMM Board into J1 on the Engine Daughter Board. Orient pin one on the Flash SIMM Board towards J803 on the Engine Daughter Board.

✎ NOTE: *The Flash SIMM Board should be aligned so that the center notch lines up with the key in the center of the SIMM connector. After the Flash SIMM is installed, make sure each connector finger is aligned with the pads on the Flash SIMM Board. If the pads are not aligned, remove the SIMM and reinstall.*

4. *For Keyboard models only:* check the revision level of the Engine Mother Board, to determine if you need to install the DC Power Cable.

    If the Engine Mother Board is revision G or later AND there is a cable connecting J920 (shown in Figure 8) on the Engine Mother Board to the instrument's power supply, you do not need to connect the DC Power Cable included with the KDFX Option Kit; discard the cable and continue with the next numbered step in these installation instructions. Otherwise, attach the DC Power Cable, as described here.

✎ NOTE: *The splices in this step can only be used once. Be certain that you've connected everything properly before you use pliers to close a splice. For your convenience, the KDFX Option Kit is shipped with an extra splice.*

    Insert the loose end of the white wire on the DC Power Cable into the side of the splice with a stopper, as shown in Figure 9. Make sure that the wire lies straight in the groove, and the end of the wire rests against the stopper.
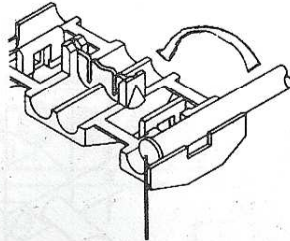
End of wire rests against stopper.

Figure 9.

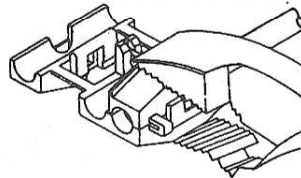Use pliers to fold over the side of the splice that has the white wire inserted.

Figure 10.

Attach the loose grey wire on the DC Power Cable to another splice, using the same procedure you used with the white wire.

With splices on both loose ends of the DC Power Cable, you will now splice the DC Power Cable to the K2500's existing power cable. Use pliers to fold the empty side of each splice onto the appropriate wire in the K2500, as shown here:
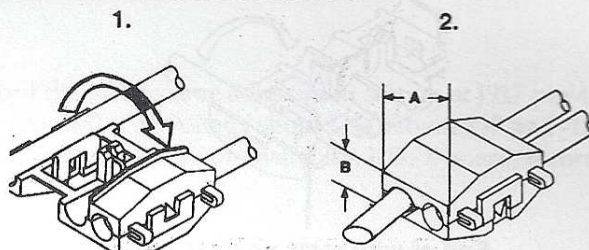

Figure 11.

Connect the wires as described below. You may first unplug the K2500 Power Supply Cable, if you find that more convenient.

- Splice the white wire of the DC Power Cable to the wire connected to pin one of J103 on the K2500's power supply. **Important:** you must make this splice approximately three inches (76mm) from the connector.
- Splice the grey wire of the DC Power Cable to the wire connected to pin two of J103 on the K2500's power supply. **Important:** you must make this splice approximately three inches (76mm) from the connector.

Plug the connector on the DC Power Cable into J1008 on the KDFX Board. The connector is keyed, and can only be inserted one way. Also, if you've disconnected the K2500 Power Supply Cable, reconnect it at this time.

If this unit has a Sampling Option Board installed, follow steps 5 through 10. If this unit does not have a Sampling Option Board installed, follow step 11.

5. See Figure 8. Locate socket J801 on the Engine Daughter Board. Remove the Ribbon Cable Retaining Clip holding the cable to this socket, but leave the cable in place.

WARNING: *If you do not remove the Ribbon Cable Retaining Clip, the KDFX Board will short out when you turn the K2500 on. The KDFX Board will hold the cable in place without a Retaining Clip.*

6. See Figure 12 for rack units, or Figure 13 for keyboard units. Locate the Digital I/O Board in the rear panel of the K2500. Using a Phillips screwdriver, remove the screws holding the board in place. Then remove the optical connector cap from this board.

7. Remove the Digital I/O Board from the rear panel.

8. Unplug the 6-pin Digital I/O cable from J1201 on the Digital I/O board, then unplug the 3-pin Optical Out cable from J1205 on this board. Leave these cables plugged into the Sampling Option Board.

9. Discard the Digital I/O Board that you just removed.

NOTE: *The KDFX Option Kit comes with a new Digital I/O Board. You will replace the discarded Digital I/O Board with the one included in the KDFX Option Kit.*

10. Plug the unconnected end of the 6-pin Digital I/O Cable into socket J1003 on the KDFX Board. Then plug the unconnected end of the 3-pin Optical Out Cable into socket J1006 on this board. The connectors on these cables are keyed so that they will only connect to the board one way.

11. See Figure 12 for rack units, or Figure 13 for keyboard units. Using a Phillips screwdriver, remove the four screws holding the plate behind the rear panel Digital I/O holes. You may discard the plate.
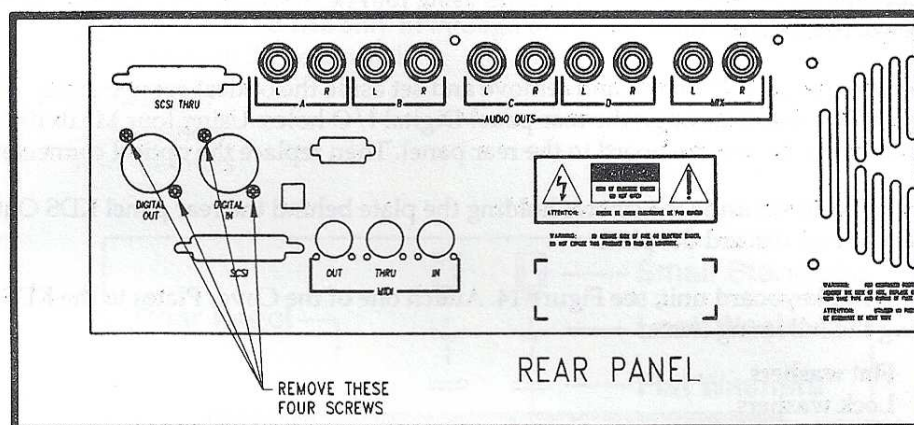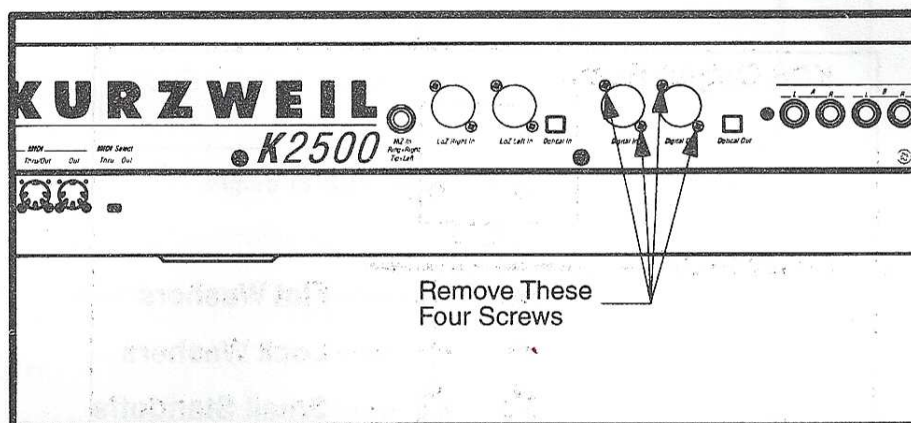

Figure 12.

Figure 13.

12. See Figure 8, and locate the Engine Daughter Board. Remove the jumper from J805, located to the left of connector J803 on this board. (Rev. C and earlier Engine Daughter Boards do not have J805; instead there is a wire jumper across connector sockets 88 and 89 of J803. Remove and discard this wire jumper.)

13. Using a #2 Phillips screwdriver, remove the four screws that hold the Engine Daughter Board in place. *Do not* remove the Engine Daughter Board.

    Arrows in Figure 2 and Figure 8 show the locations of the four screws.

14. Insert the four large standoffs in place of the Engine Daughter Board screws. Using a flat-head screwdriver, tighten the standoffs.

15. Insert the pins on the bottom of the KDFX Board into J803 on the Engine Daughter Board.

    The best way to do this is to slightly angle the board so that you can position the rear pins first.

When the rear pins are correctly located, carefully insert the remaining pins into socket J803 on the Engine Daughter Board. Apply even pressure to the KDFX Board, then inspect the four holes on the board to make sure that they line up with the standoffs on the Engine Daughter Board.

16. Secure the KDFX Board to the standoffs using four M3x6mm screws. Using a #2 Phillips screwdriver, tighten the screws.

17. Take the Digital I/O Board, and remove and set aside the optical connector cap. Position the Digital I/O Board through the rear panel Digital I/O holes. Using four M3.0x10.0mm black pan-head screws, secure the board to the rear panel. Then replace the optical connector cap.

18. Remove and set aside the screws holding the plate behind the rear panel KDS Output hole. Remove and discard the plate.

19. If this is a keyboard unit, see Figure 14. Attach one of the Cover Plates to the KDS Output Board, using the following items:

    - Flat washers
    - Lock washers
    - 3/16" hex nuts

    Use the large Cover Plate if the K2500 has a large KDS Output hole, or the small Cover Plate if the K2500 has a small KDS Output hole. Discard the unused plate.
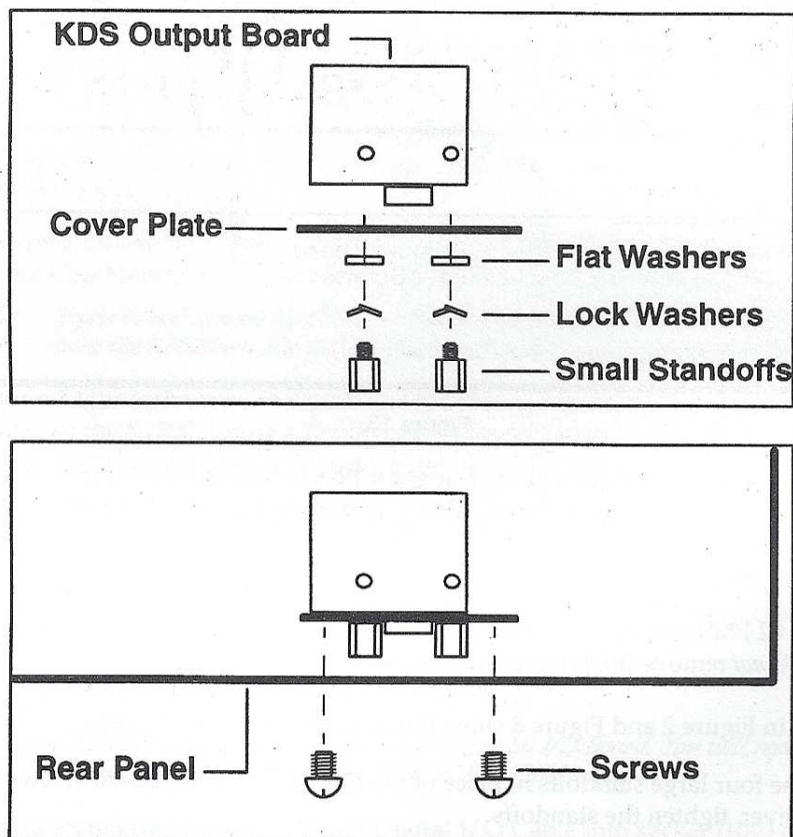

Figure 14. KDS Output Board Installation–K2500/X Keyboard.

Using a 3/16" nut driver, tighten the small standoffs. Then position the KDS Output Board through the rear panel KDS Output hole, making sure that the component side of the board faces down. Using M3x6 screws, secure the board to the rear panel.

20. If this is a rack unit, see Figure 15. Position the KDS Output Board through the rear panel KDS Output hole; the board will only fit through this hole one way. Then use the following items to secure the board to the rear panel:

   - Flat washers
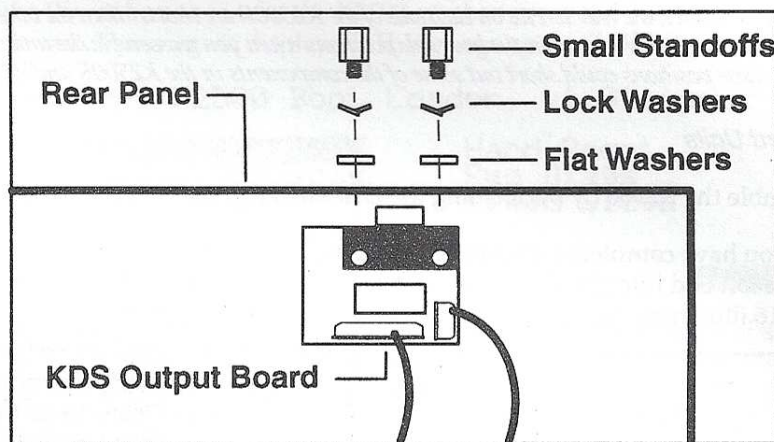   - Lock washers
   - 3/16" hex nuts

Figure 15. KDS Output Board Installation–K2500R.

Using a 3/16" nut driver, tighten the hex nuts.

The installation is complete, and you can recalibrate the unit.

Recalibration

1. Readjust VCC voltage to 5.0 Volts, DC.

   Rack: With unit turned off, attach negative clip lead of the digital voltmeter to the heat sink, and the positive lead to Q12 Source. Turn the unit on, then adjust R180 on the power supply board until the meter reads within 4.95 – 5.05 Volts.

   Keyboard: Attach negative clip lead of the digital voltmeter to J711, pin 1, and the positive lead to J711, pin 2 on the Audio Board. Then adjust R6 on the power supply board until the meter reads within 4.95 – 5.05 Volts.

2. Readjust the LCD Contrast Voltage to the level recorded at the beginning of this installation. Check the setting at J917 pin 4 on the Mother Board (pin 1 is ground), and adjust it at R72 on the Keyboard Audio Board or R246 on the Rack Audio Board.

Reassembly

Reassembly for Rack Units

1. Reassemble the K2500R by performing the Disassembly steps in reverse order.

2. When you have completed all connections, slide the top cover back on. Be sure to fit the front top edge of the cover into the groove on the top of the front panel.

3. Replace the six long M4 screws and the two short M4 screws in the left and right sides of the unit. Then replace the two small M3 screws along the top edge of the rear panel.

⚡ **WARNING:** *Remember, the rear screws on each side of the K2500R are shorter than the other side screws. Make sure to use the shorter screws in the back side positions when you reassemble the unit. Using the longer screws in these positions could short out some of the components in the K2500R and damage the unit.*

Reassembly for Keyboard Units

1. Reassemble the K2500 by performing the Disassembly steps in reverse order.

2. When you have completed all connections, tilt the top cover back onto the body of the K2500. First, slide the left end into place, making sure to fit the Floppy Disk Bezel under the left end cap. Figure 16 illustrates the right and wrong way to fit the Floppy Disk Bezel.
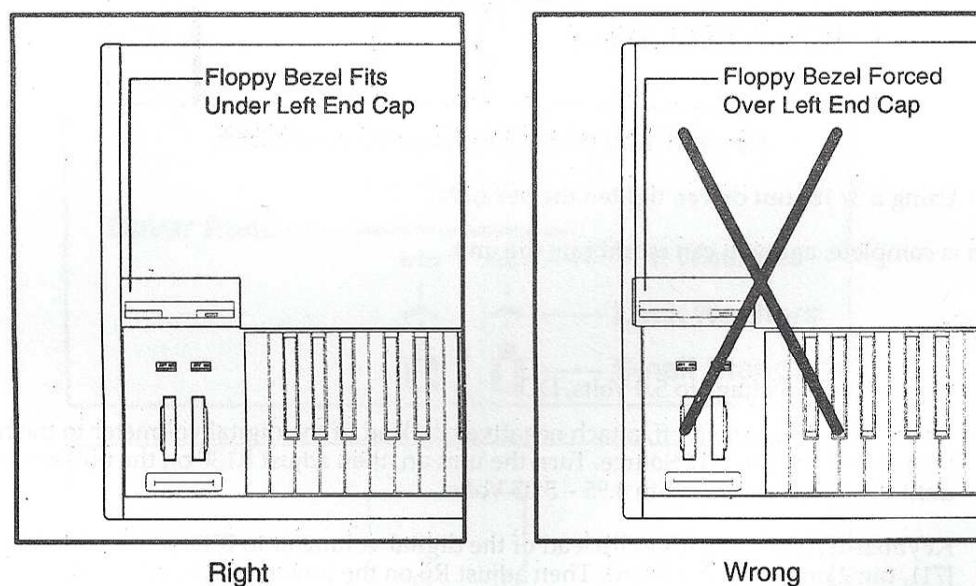

Floppy Bezel Fits Under Left End Cap — Right

Floppy Bezel Forced Over Left End Cap — Wrong

Figure 16.

⚠ **CAUTION:** *Before you lower the right end of the top cover, be sure that no ribbon cables are covering the fan on the right side of the unit.*

3. Now lower the right end until it falls into place; be careful not to scratch the right end cap. If you feel any resistance, lift the top cover and look for cables which may be blocking it.

4. Pull the top cover toward you until it locks securely in place.

5. Replace the 11 screws you removed from the rear panel of the K2500. Then tilt the unit back, and replace the screws in the holes from which they were removed in the bottom of the unit. The

bottom screws are self-threading, so to avoid stripping the threads, start the screws by hand before using a screwdriver. If a thread does become stripped, use an adjacent screw hole.

Operating System Load/Diagnostics

1. Remove all cables from the K2500 except the AC power cord.

2. If the K2500 is on, press the Power button to turn it off, since you will need to restart the K2500 to perform the following steps.

3. Press the Power button to turn the K2500 on, then press and release the **Exit** button while the "Please wait..." message is displayed. This brings up the K2500 Boot Loader (shown below).

```
-------- K2500 Boot Loader  v1.01 --------

   Install System        Hard Reset
   Install Objects       Run Diags
   Run System            Fixed Diags

                                    OK
```

The Boot Loader's Menus resemble K2500 dialog boxes. They consist of a series of labels and a highlight bar you use to select one of the labels. Use the arrow keys or the data wheel to move the highlight bar. Then press the **OK** soft button or the **Enter** key to invoke the highlighted menu option.

Install the New Boot Loader

4. Check the Boot Loader version displayed on the top line of the screen. If the Boot Loader version is the same or later than the version included with this kit, then you do not need to install a new Boot Loader, skip to "Install the Operating System and Objects."

5. Insert the KDFX Installer disk that came with the KDFX Option Kit into the K2500's floppy drive.

6. Choose "Install System" from the menu.

7. Highlight "floppy" at the "Device to install from:" prompt. Press **OK**.

8. Highlight the file named "K25AB***.KOS (where *** is the version number). Press **OK**, then **OK** again to confirm. When the Boot Block Installer has loaded, you will be returned to the Boot Loader menu.

9. Power-cycle the K2500 (i.e., turn it off, then on again). Do NOT press the **Exit** soft button.

10. Choose "Install BootBlk".

11. Highlight "floppy" at the "Device to install from:" prompt. Press **OK**.

⚠ *WARNING:* *During the next step you will be instructed to install the new "standard Boot Loader". Do not touch the instrument while this file is loading. Disrupting this file load may render the instrument useless and require PCB replacement or special programming equipment.*

12. Highlight the file named "K25SB***.KBB (where *** is the version number). Press **OK**, then **OK** again to confirm. After the new Boot Loader is installed, you will be returned to the Boot Installer menu.

13. Power-cycle the unit, then press and release the Exit button while the "Please wait..." message is displayed.

14. Verify that the Boot Loader version matches the version you just installed.

Install the Operating System and Objects

15. Insert the Operating System disk that came with the KDFX Option Kit into the K2500's floppy drive.

16. Choose "Install System" from the Boot Loader menu.

17. Highlight "floppy" at the "Device to install from:" prompt. Press **OK**.

18. Highlight the file named "K25V***.KOS" (where *** is the version number). Press **OK**, then **OK** again to confirm. When the operating system has loaded, you will be returned to the Boot Loader menu. Remove the Operating System disk.

19. Insert the Base ROM Objects disk that came with the KDFX Option Kit into the K2500's floppy drive, then choose "Install Objects" from the Boot Loader menu.

20. Highlight "floppy" at the "Device to install from:" prompt. Press **OK**.

21. Highlight the file named "OBJKB***.K25" (where *** is the version number). Press **OK**, then follow the prompts on the display to load this object set, and all of the other object sets that may be required for this instrument's configuration. The different object sets are shown in the table below:

Object Set	Use for:
OBJKB***.K25	Base ROM
OBJKP***.K25	Stereo Piano ROM
OBJKO***.K25	Orchestral ROM
OBJKC***.K25	Contemporary ROM
OBJKL***.K25	Live Mode (use only if Sampling Option is installed)

For example, if the K2500 has the Stereo Piano ROM and Sampling Options installed, you should load the OBJKB***.K25, OBJKP***.K25, and OBJKL***.K25 object sets. Note that you must always install the Base ROM objects. When the objects have loaded, you will again be asked to choose a "Device to install from:" Press **Done**, and you will be returned to the Boot Loader menu.

22. Choose "Hard Reset" from the Boot Loader. After you confirm this choice, the K2500 performs a hard reset.

23. Choose "Run System" from the Boot Loader. Confirm that the K2500 starts up with the new operating system and objects.

Run the Diagnostics

24. Turn the K2500 off, since you will need to restart the K2500 to run the diagnostics.

25. Press the Power button to turn the K2500 on, then press and release the **Exit** button while the "Please wait..." message is displayed.

26. Select "Run Diags" from the Boot Loader menu. Press any key to continue when the RAM erasure message appears.

27. Choose "KDFX Option" from the Diagnostics menu.

28. Press **OK** to begin testing. A "Success" message should appear after approximately 45 seconds. If this message does not appear, turn off the power and review the installation procedure for errors.

Audition the KDFX option.

29. Turn the K2500 off, and connect an audio system to the A Outputs.

30. Make sure that your audio system is turned down to a reasonable listening level, then turn the K2500 on.

31. Insert the KDFX Installer disk that came with the KDFX Option Kit into the K2500's floppy drive.

32. Press the Disk button, and highlight "floppy" at the "Current Disk:" prompt. Press **Load.**

33. Highlight the file named "Kdfxtest.K25. Press **OK** twice, then **Fill.**

34. Press the Program button.

35. Select the program "200 KDFX Test."

36. Press the Edit button.

37. Play and hold a chord. (On a rack unit, press and hold the CANCEL button on the alphanumeric pad, then press one or more of the other alphanumeric buttons to play various notes.) You should hear the organ with FX. Continue to hold the chord for the next step.

38. Press the Effects button. In "edit" mode this button is "FX Bypass." After pressing the button, you should hear the organ without KDFX processing. Toggle the Effects button to switch between FX and no FX.

39. When you have confirmed that the KDFX option is working, press Exit, then the Master button.

40. Remove the KDFX Test program by pressing the **Delete** soft button. Use the alpha wheel to select "Everything". Then press **OK.** Press **Yes** to confirm the deletion.

This completes the installation of the KDFX Option. Be sure to give the K2500 owner the Operating System and Objects disks that came with this kit. The KDFX Installer disk, however, is meant only for service center use.